

WHAT IS CLAIMED IS:

1. A variable tumble flow-generating device of an engine, which comprises:  
a bulkhead for dividing an intake port into a first passage and a second passage;  
5 an opening degree control valve for selectively changing an opening degree of the  
first and second passages; and  
driving means for operating the opening angle control valve.

2. The variable tumble flow-generating device of the engine according to Claim 1,  
10 in which an air inlet-facing end of the bulkhead has a slant surface shape which is  
slanted at a desired angle.

3. The variable tumble flow-generating device of the engine according to Claim 1,  
in which an air inlet-facing end of the bulkhead has a shape formed by intersecting two of  
15 slant surfaces slanted at a desired angle, in an opposite direction.

4. The variable tumble flow-generating device of the engine according to Claim 1,  
in which an air inlet-facing end of the bulkhead has a round shape.

20 5. The variable tumble flow-generating device of the engine according to Claim 1,  
in which an air outlet-facing end of the bulkhead has a slant surface shape which is  
slanted at a desired angle.

6. The variable tumble flow-generating device of the engine according to Claim 1,  
25 in which an air outlet-facing end of the bulkhead has a shape formed by intersecting two  
of slant surfaces slanted at a desired angle, in an opposite direction.

7. The variable tumble flow-generating device of the engine according to Claim 1,

in which an air outlet-facing end of the bulkhead has a round shape.

8. The variable tumble flow-generating device of the engine according to Claim 1, in which an air inlet-facing end of the bulkhead has rugged portions formed thereon.

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9. The variable tumble flow-generating device of the engine according to Claim 1, in which an air inlet-facing end of the bulkhead has grooves formed thereon.

10. The variable tumble flow-generating device of the engine according to Claim 1, in which the bulkhead is disposed in such a manner that the first passage and the second passage are different from each other in cross-section area.

11. The variable tumble flow-generating device of the engine according to Claim 1, in which the driving means is a stepping motor.

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12. A manufacturing method of a variable tumble flow-generating intake port, which comprises the steps of:

preparing an upper mold in which a space for forming a first passage of an intake port is provided;

20 preparing a lower mold in which a space for forming a second passage of the intake port is provided;

forming a stepped portion being capable of assembling with a metal plate, at a portion where the upper and lower molds are assembled with each other;

assembling the metal plate serving as a bulkhead, with the stepped portion;

25 assembling the upper mold with the lower mold and filling a molding sand into the resulting mold assembly;

disassembling the mold disassembly so as to release an intake port core integral with the metal plate; and

assembling and casting the intake port core with a mold in which a cylinder head is cast, and removing the casting sand from the intake port core such that the metal plate serving as the bulkhead remains in the intake port.

5           13. The manufacturing method of a variable tumble flow-generating intake port according to Claim 12, in which the first passage and the second passage are formed so as to have a different cross-section area, in the upper mold-preparing step and the lower mold-preparing step, respectively.

10           14. The manufacturing method of a variable tumble flow-generating intake port according to Claim 12, in which the metal plate assembled in the metal plate-assembling step has a bent portion, so that the first passage and the second passage are formed so as to a different cross-section area by the bent portion.

15           15. The manufacturing method of a variable tumble flow-generating intake port according to Claim 12, in which the stepped portion in the stepped portion-forming step is formed at the upper mold and the lower mold, respectively, in a groove shape, so that a center in a thick-wise direction of the metal plate is located on a mold separation line between the upper mold and the lower mold.

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          16. The manufacturing method of a variable tumble flow-generating intake port according to Claim 12, in which the stepped portion in the stepped portion-forming step is formed at the upper mold in a groove shape, so that a lower mold-facing surface of the metal plate is located on a mold separation line between the upper mold and the lower  
25   mold.

          17. The manufacturing method of a variable tumble flow-generating intake port according to Claim 12, in which the stepped portion in the stepped portion-forming step

is formed at the lower mold in a groove shape, so that a upper mold-facing surface of the metal plate is located on a mold separation line between the upper mold and the lower mold.

5           18. The manufacturing method of a variable tumble flow-generating intake port according to Claim 12, in which the stepped portion is formed at the upper mold in a groove shape and formed at the lower mold in a protrusion shape.

10           19. The manufacturing method of a variable tumble flow-generating intake port according to Claim 12, in which the stepped portion is formed at the upper mold in a protrusion shape and formed at the lower mold in a groove shape.

15           20. The manufacturing method of a variable tumble flow-generating intake port according to Claim 12, in which a positioning hole is formed at the metal plate assembled in the metal plate-assembling step, and a protrusion to be inserted into the positioning hole is formed in the upper mold-preparing step.

20           21. The manufacturing method of a variable tumble flow-generating intake port according to Claim 12, in which the metal plate assembled in the metal plate-assembling step is made of a material having a higher melting point than that of a base metal for forming the cylinder head.